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HISTORICAL BIOGEOGRAPHY OF NEBRASKA PRONGHORNS (*ANTILOCAPRA AMERICANA*)

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ABSTRACT—Archeological and paleontological records indicate that the pronghorn (*Antilocapra americana*) have a history of at least 20,000 years of occurrence within the current boundaries of Nebraska. Pronghorns occurred throughout the state for much of its history. With the evidence at hand we concluded that the eastern boundary of the geographic distribution of the pronghorn south of the Niobrara River in Nebraska at the beginning of the 19th century was along the western perimeter of the eastern deciduous forest and tallgrass prairie. This excluded most of the easternmost tier of counties in the state. This geographic arrangement persisted throughout most of the Holocene. The boundary, however, was never a straight line, but a dynamic system of fluctuating distribution. By the early 20th century, the pronghorn was nearly extirpated from Nebraska, with only scattered herds in the western panhandle. With a ban on hunting beginning in 1907 and management by the Nebraska Game and Parks Commission, the population in the panhandle had increased to the point that a hunting season was reinstituted in 1953. To establish herds of pronghorns in previously occupied areas beyond the panhandle, 1,106 individuals were translocated between 1958 and 1962 primarily to the Sandhills region of Nebraska. Currently, the pronghorn possess stable populations throughout nearly half of Nebraska, including the panhandle and most of the Sandhills.

Key Words: *Antilocapra americana*, distribution, historical biogeography, Nebraska, pronghorn

INTRODUCTION

The pronghorn (*Antilocapra americana*) historically was a widespread resident of the state of Nebraska. Together with bison, elk, white-tailed deer, and mule deer, pronghorns constituted the "big game" of the plains and forest edges of the western United States, northern Mexico, and the prairie provinces of central Canada. The population of pronghorns has undergone many changes over the more than 200-year history of Nebraska, but the species remains part of the fauna of some areas of the state under regulation and management of the Nebraska Game and Parks Commission (NGPC). The Lewis and Clark expedition produced one of the earliest written records of pronghorns based on observations made on September 3, 1804, near the mouth of the Niobrara River

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in northeastern Nebraska. William Clark noted in his journal: "Several wild Goats Seen in the Plains they are wild & fleet" (Moulton 1987:44).

As was the case with Captain Clark, some early writers considered the pronghorn to be a goat or related to goats. Many authors, including many modern authors, refer to the species under the common name of antelope. However, as noted by one early writer (Paul Wilhelm 1973:332): "I consider the designation *Antilocapra americana* as more fitting since the head and the hoofs would classify them among the goats, their mode of living, however, among the antelopes." Indeed, the genus name *Antilocapra* reflects this dual identity, *Antilo-* based on the Greek for a horned mammal and the basis of the generic name *Antilope* for the Indian blackbuck, and *-capra* from the Latin meaning goat. Thus the name would mean the "antelope goat," but the pronghorn is neither antelope nor goat. Both antelope and goats are members of the mammalian family Bovidae, which originated in the Old World, being members of the subfamilies Antilopinae (antelopes) and Caprinae (goats and sheep), respectively. The pronghorn, however, is the sole living representative of the family Antilocapridae. This family is strictly New World in its origin and distribution, and although there is only one living genus and species, there are at least 20 fossil genera with a history extending back to about 20 million years ago in the Early Miocene (McKenna and Bell 1997:422–23).

The pronghorn has been the subject of extensive research dealing both with its basic biology as well as its management as a game species (O'Gara 1978; O'Gara and Yoakum 2004). However, in Nebraska along the eastern boundary of the geographic range of the species, very few research results have been published in the scientific literature. It is our objective in this article to continue to fill this gap in our knowledge of this important species (Hoffman et al. 2010). We attempt to develop a picture of the trends in geographic distribution of pronghorns in Nebraska.

First, based on archeological and paleontological literature, we assess the Holocene distribution of the species. Second, we estimate the historical distribution of pronghorns in Nebraska based on the written record of direct observations, covering the period from Lewis and Clark's first observation in 1804 through the beginning of transplanting of herds in 1958. Finally, we determine the current distribution of pronghorns in Nebraska based on recent population surveys and reintroductions by the Nebraska Game and Parks Commission.

METHODS

We identified records of pronghorns during the Holocene by surveying the archeological and paleontological literature. We defined the Holocene as that time period from the end of Pleistocene glaciation (≈12,000 BC) until 1850. This literature, particularly reports on archeological sites, is extremely scattered and presents significant challenges in completing a thorough survey. These reports range from books published by major university and commercial presses, to reports kept in the files of individual investigators or historical organizations. Only one or two copies of some reports have ever existed. We hope that our efforts have found and evaluated as much as 90% of this relevant literature. The identification of pronghorn remains is based on the original reports. We have included only those records in which the investigators definitively identified the remains as those of the pronghorn. There are some challenges in interpreting some archeology records. For instance, these records are associated primarily with human hunting activity. This is problematic because the location of the remains probably represented the area where hunters brought the animal to be eaten and not where it was killed. Skeletal remains that were made into utilitarian and ceremonial objects could be subject to even longer distance transportation by humans.

The historical distribution was determined based on written observations gathered from the published literature, information noted in the accounts of early expeditions that took place within the state, and museum records. These records cover a period from 1804 to 1958. Although there is overlap in time periods covered by the Holocene (≈12,000 BC to 1850) and historical (1804–1958) records, the nature of these records differentiates the two. Holocene records are based on the physical objects represented by the bones of the pronghorn. The historical records are based solely on written reports of human observations. Finally, we searched the MaNIS (Mammal Networked Information System) website for any museum specimens of pronghorn that were collected in Nebraska.

The current distribution was estimated through data collected from the Nebraska Game and Parks Commission, including harvest records, population monitoring, relocation of populations, and observations made by wildlife biologists. Information on current Nebraska pronghorn populations primarily was taken from the Pittman-Robertson W-15-R Pronghorn Job Completion Report series compiled by the NGPC. This information

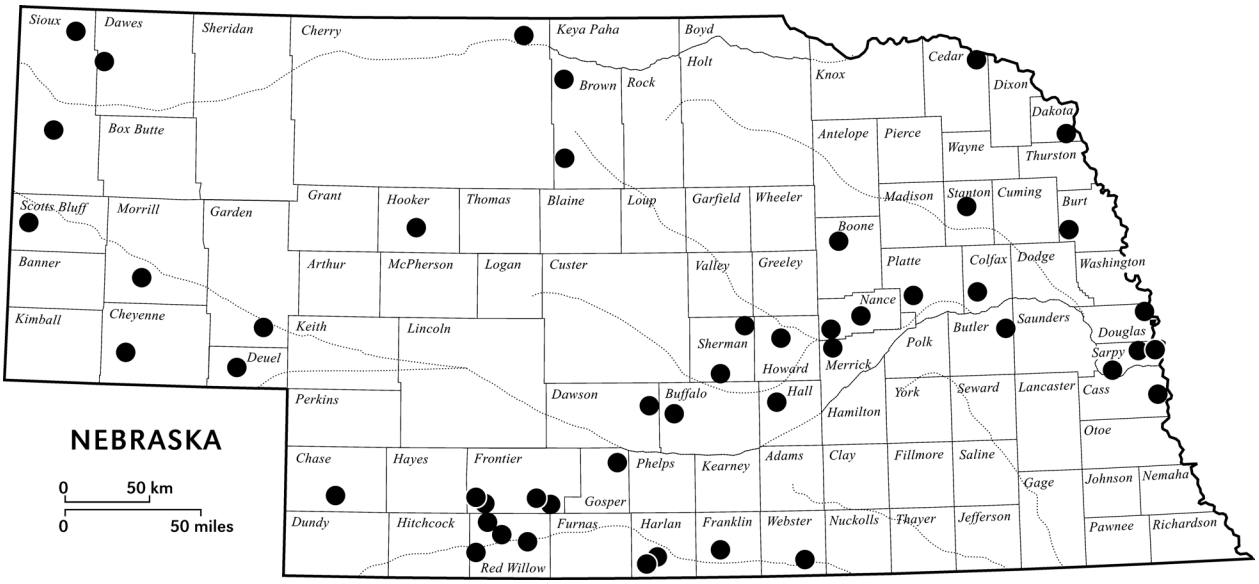

Figure 1. Location of Holocene records of pronghorn (*Antilocapra americana*) in Nebraska.

summarized all the work conducted in a calendar year by the NGPC as it pertained to the management of pronghorns in Nebraska. This included inventory and monitoring of populations, harvest records, and various special projects undertaken.

RESULTS

Holocene Records

Archeological and paleontological records provide some insight into the early distribution of pronghorns in Nebraska and indicate that this species has a long history of occurrence within the boundaries of the current state (Fig. 1, Table 1). Our search of the literature has identified 72 archeological and paleontological sites in 35 counties where remains of pronghorns have been found in Nebraska. There is an almost continuous record in space and time through the Holocene. There are records from eastern Nebraska in Douglas and Cass Counties, from western Nebraska in Scotts Bluff and Sioux Counties, from northern Nebraska in Cedar and Cherry Counties, and from southern Nebraska in Red Willow and Webster Counties. The concentration of archeological records in southwestern Nebraska is the result of intensive archeological surveys associated with dam building in Frontier, Harlan, and Red Willow Counties. On the other hand, southeastern Nebraska and the Sandhills of central Nebraska lack sites where pronghorn remains have been found, at least in part because of the restricted number of archeological surveys conducted in these areas.

The oldest records for *Antilocapra americana* in Nebraska come from two fossil sites in Red Willow County (Rw-101, Rw-102) believed to date from the late Wisconsin ice age, about 20,000 years ago. This was probably a time near the end of the last continental glaciation when there was a fauna of 24 species, of which half are now extinct and another six no longer occur in the state (Corner 1977; Chorn et al. 1988). The oldest archeological site (11,000–7500 BC) from which pronghorn remains have been recovered in Nebraska is the Allen site (25FT50) in Frontier County, discovered as part of the work on the Medicine Creek Reservoir (Bamforth 2002). At the nearby site of Lime Creek (25FT41), remains of pronghorns from 7500 BC were recorded. In western Nebraska, a pronghorn found just above the Hudson-Meng bone bed dates from nearly 8000 BC. These three sites are believed to have been occupied by Paleoindians.

At a slightly younger site in eastern Nebraska, pronghorn material was recovered from the Logan Creek site (25BT3) in Burt County, which is believed to have been occupied by Early Plains Archaic people by 5000 BC (Snyder and Bozell 1983; Semken and Falk 1987). Other Plains Archaic sites (6000 BC–AD 500) where pronghorn material has been recovered include 25DW59 in Dawes County, the Spring Creek site (25FT31) in Frontier County, the Signal Butte site in Scotts Bluff County, and two sites (25SX157, 25SX163) in the Agate Fossil Beds

TABLE 1
HOLOCENE RECORDS OF THE PRONGHORN (*ANTILOCAPRA AMERICANA*)
FROM 72 ARCHEOLOGICAL AND PALEONTOLOGICAL SITES IN 35 COUNTIES IN NEBRASKA

County	Site	Specific location	Age	Reference
Boone	Beaver Creek Site, 25BO23	4.5 miles south of Petersburg	AD 1100–1400	Koch and Nelson 2002:87
Brown	McIntosh Site, 25BW15	Enders Lake, ≈12 miles south, 12.5 miles west of Ainsworth	AD 1200–1450	Koch 2004:117
Brown	25BW252	16 miles north, 5.5 miles west of Johnstown	Unknown	Pepperl and Falk 1983:B81
Buffalo	*25BF161*	*SE 1/4, NE 1/4, Sec. 18, T10N, R17W*	Unknown	Ludwickson 1978b:35
Buffalo	25BF187	3.75 miles northwest of Amherst	AD 1000–1350	Ludwickson 1978b:35
Burt	Logan Creek Site B, 25BT3	Logan Creek, southwest of Oakland	BC 4340 ± 120	Snyder and Bozell 1983:20 Graham et al. 1987:283 Widga 2006:67
Burt	*Logan Creek Site C, 25BT3*	*Logan Creek, southwest of Oakland*	BC 5020 ± 90	Snyder and Bozell 1983:20 Graham et al. 1987:283 Widga 2006:67
Burt	*Logan Creek Site D, 25BT3*	*Logan Creek, southwest of Oakland*	BC 5070 ± 110	Widga 2006:68
Butler	Barcal Site, 25BU4	Near Abie	AD 1700–1750	O'Shea and Ludwickson 1992:338
Cass	Walker Gilmore, 25CC28	6 miles southeast of Murray	AD 800–1285	Strong 1935:194
Cedar	Ferber Site, 25CD10	Near Bow Valley Mill	AD 800–1300	Ludwickson et al. 1981:22–23
Chase	Lovitt Site, 25CH1	12 miles west of Wauneta	Circa AD 1700	Hill and Metcalf 1942:204; Gunnerson 1960:212–216
Cherry	25CE309	3 miles south, 0.4 miles west of Sparks	AD 0–1000	Pepperl and Falk 1983:B85
Cheyenne	Thurston Site, 25CN11	Lodgepole Creek, 6 miles east of Potter	AD 0–1000	Jensen 1973:167
Colfax	Schuyler Site, 25CX1	along Shell Creek, ≈3 miles northwest of Schuyler	AD 1500–1650	Bozell et al. 1982:28 Graham et al. 1987:286
Dakota	Hancock Site, 25DK14	1 mile southeast of Homer	AD 1450–1500	Frantz 1963:97–98
Dawes	25DW59	0.70 mile west of Crawford	BC 1000–AD 900	Bozell and Ludwickson 1988:86
Dawson	25DS118	SE 1/4, SW 1/4, SE 1/4, Sec. 16, T10N, R19W	AD 1000–1350	Ludwickson 1978b:36
Douglas	Ponca Creek District	2.25 miles north of former town of Florence	Unknown	Gilder 1907:706, 711
Duel	Neumann Site, 25DU3	Lodgepole Creek, 3.5 miles southeast of Chappell	AD 0–1000	Carlson 1973:104
Franklin	Lost Creek Site	Lost Creek, 2.25 miles south, 1.5 miles east of Bloomington	AD 1000–1350	Strong 1935:100
Frontier	*Owens Site, 25FT3*	*On Medicine Creek*	AD 1000	Mick 1983:172 Graham et al. 1987:285
Frontier	*25FT13*	*Vicinity of Medicine Creek Dam*	AD 1010	Mick 1983:175 Graham et al. 1987:285 Kivett and Metcalf 1997:213
Frontier	*25FT14*	*Vicinity of Medicine Creek Dam*	AD 1250–1400	Mick 1983:182 Kivett and Metcalf 1997:213
Frontier	*25FT16*	*Vicinity of Medicine Creek Dam*	AD 1020–1235	Mick 1983:185 Graham et al. 1987:285 Kivett and Metcalf 1997:213

TABLE 1 continued

County	Site	Specific location	Age	Reference
Frontier	25FT17	Vicinity of Medicine Creek Dam	AD 1080–1240	Mick 1983:191 Graham et al. 1987:286 Kivett and Metcalf 1997:213
Frontier	*25FT18*	*Near point where Lime Creek originally entered Medicine Creek*	AD 595 ± 225	Kivett and Metcalf 1997:212
Frontier	*25FT20*	*Near point where Lime Creek originally entered Medicine Creek*	AD 1000–1350	Kivett and Metcalf 1997:213
Frontier	*25FT22*	*≈ 4 km upstream on Medicine Creek from Medicine Creek Dam*	AD 1000–1350	Nepstad-Thornberry et al. 2002:199
Frontier	*25FT30*	*Near point where Lime Creek originally entered Medicine Creek*	AD 1100–1300	Mick 1983:202 Graham et al. 1987:286 Kivett and Metcalf 1997:213
Frontier	Spring Creek Site, 25FT31	Red Willow Creek, adjacent to Red Willow Dam	BC 3850–3500	Granger 1980:166 Widga 2004:29
Frontier	*Mowry Bluff Site, 25FT35*	*6 miles northwest of Cambridge (in Furnas County)*	AD 1020–1180	Falk 1969a:42, 1969b:48 Mick 1983:205 Graham et al. 1987:286:213 Nepstad-Thornberry et al. 2002:199
Frontier	*25FT36*	*≈4 km upstream on Medicine Creek from Medicine Creek Dam*	AD 1175 ± 25	Mick 1983:206 Kivett and Metcalf 1997:213
Frontier	*25FT39*	*≈5 km upstream on Medicine Creek from Medicine Creek Dam*	AD 1200–1280	Mick 1983:210 Graham et al. 1987:286 Kivett and Metcalf 1997:213
Frontier	*Lime Creek Site, 25FT41*	*North side of Lime Creek valley, 1 mile from original junction of Lime and Medicine creeks*	BC 7500–6000	Davis 1962:23 Graham et al. 1987:283 Wedel 1986:69
Frontier	Allen Site, 25FT50	≈3 miles upstream from Medicine Creek Dam	BC 11,000–7500	Holder and Wike 1949:261 Bamforth 2002:65 Hudson 2007:195
Frontier	25FT54	Red Willow Creek, 5 miles upstream from Red Willow Dam	AD 1310	Granger 1980:166 Mick 1983:169
Frontier	*25FT70*	*Vicinity of Medicine Creek Dam*	AD 690–1450	Mick 1983:210 Graham et al. 1987:286 Kivett and Metcalf 1997:213 Nepstad-Thornberry et al. 2002:199
Garden	Ash Hollow Cave Site, 25GD2	3 miles southeast of Lewellen	AD 0–1700	Champe 1946:43
Gosper	Wallace Site, 25GO2	Plum Creek, 5.5 miles north, 9.5 miles east of Elwood	AD 425–650	Winfrey 1991:83
Hall	Hulme Site, 25HL28	16 miles west of Grand Island	AD1170–1220	Bozell 1991:234
Harlan	25HN36	2 miles south of Alma	AD 1050–1350	Adair and Brown 1987:154, 585
Harlan	25HN40	0.8 mile south, 2 miles east of Alma	AD 400–900	Adair and Brown 1987:194, 590
Hooker	Humphrey Site, 25HO21	Middle Loup River, about 5 miles east of Mullen	Circa AD 1700	Gunnerson 1960:204
Hooker	*Kelso Site, 25HO23*	*Middle Loup River, about 5 miles east of Mullen*	AD 0–1000	Kivett 1952:39–40
Howard	Schmidt Site, 25HW301	Along North Loup River, near Elba	AD 1100–1550	Mick 1983:157 Graham et al. 1987:284
Merrick	Tahaksu Site, 25MK15	4.8 miles north, 1.2 miles west of Palmer	AD 1100–1400	Watson 1996:135
Morrill	Greenwood Site	Old Greenwood Stage Station, Keenan Ranch, ≈9 miles south, 8 miles east of Redington	Unknown	Renaud 1933:14

TABLE 1 continued

County	Site	Specific location	Age	Reference
Nance	Brown Site, 25NC8	Vicinity of Fullerton	AD 1250–1450	Ludwickson 1978a:98 Mick 1983:160 Graham et al. 1987:285
Nance	*Cunningham Site, 25NC10*	*Vicinity of Fullerton*	AD 1250–1450	Ludwickson 1978a:98 Mick 1983:163 Graham et al. 1987:285
Nance	*25NC13*	*Vicinity of Fullerton*	AD 1250–1450	Ludwickson 1978a:98 Mick 1983:166
Nance	Palmer Locality (in part), 25NC29	5.5 miles south, 19 miles west of Fullerton	AD 1100–1400	Meadow and Peterson 2001:157
Platte	Hill-Rupp Site, 25PT13	1.5 miles north of Monroe	AD 1650–1750	Metcalf 1941:34
Red Willow	25RW22	3 miles north, 6.25 west of Indianola	AD 1000–1350	Granger 1980:166 Mick 1983:169
Red Willow	Doyle Site, 25RW28	9.5 miles north, 0.75 mile west of McCook	BC 60–AD 680	Granger 1980:167
Red Willow	Gillen Pits, Rw-101	4.5 miles west of McCook	Late Pleistocene–early Holocene	Corner 1977:79, 85–86
Red Willow	Davidson Pits, Rw-102	1 mile west of Bartley	Late Pleistocene–early Holocene	Corner 1977:79, 85–86
Sarpy	Childs Point District	≈ 1.5 miles northwest of Bellevue	Unknown	Gilder 1909:72–73
Sarpy	Lucien Fontenelle's Post	Bellevue	AD 1822–1842	Bozell et al. 1990:30
Sarpy	Patterson Site, 25SY31	≈ 7 miles south of Gretna	AD 100–1300	Bozell and Ludwickson 1999:84
Scotts Bluff	Signal Butte Site	Signal Butte	BC 3000–AD 500	Strong 1935:236
Sherman	Bill Packer Site, 25SM9	Along Davis Creek in extreme northeastern corner of county	AD 980–1050	Graham et al. 1987:285 Bozell and Rogers 1989:28
Sherman	Sweetwater Site	0.5 mile northwest of Sweetwater (in Buffalo County)	Unknown	Champe 1936:268
Sioux	Hudson-Meng Site, 25SX115	23 miles northwest of Crawford (in Dawes County)	BC 7820	Agenbroad 1978:36
Sioux	25SX157	Agate Fossil Beds National Monument, 19.25 miles south, 5.75 miles east of Harrison	BC 6000–1000	Bozell 1993:61 Bozell 1994:48, 62
Sioux	*25SX163*	*Agate Fossil Beds National Monument, Agate Fossil Beds National Monument, 19.25 miles south, 7.25 miles east of Harrison*	BC 1000–AD 500	Bozell 1993:64
Sioux	*25SX476*	*Agate Fossil Beds National Monument, 1.7 miles east of Agate*	AD 900	Bozell 1993:67
Sioux	25SX486	*Agate Fossil Beds National Monument, Agate Fossil Beds National Monument, 19.25 miles south, 5.25 miles east of Harrison*	Unknown	Bozell 1994:50, 63
Sioux	*25SX487*	*0.1 mile north, 0.15 mile east of Visitor Center*	Unknown	Bozell 1993:67
Stanton	25ST1	1 mile east of Stanton	AD 1200–1500 and AD 1800–1833 (mixed site)	Gunnerson n.d.
Webster	Hill Site	2 miles south, 7 miles east of Red Cloud	AD 1700–1850	Wedel 1936:62
Webster	*Shipman Site, 25WT7*	*South side of Republican River, between Red Cloud and Guide Rock*	Post–AD 1350	Mick 1983:154 Graham et al. 1987:286

Note: County names and localities in roman lettering are plotted on Figure 1; those county names and localities in italics are not plotted on Figure 1 to prevent overcrowding of symbols

National Monument in Sioux County. All other pronghorn remains in Nebraska come from sites that are less than 2,000 years old.

Because eastern Nebraska is at or near the eastern boundary of the geographic range of the species, records along the eastern edge of the state and their basis are of particular interest. Material from the Logan Creek site (25BT3) in Burt County (Snyder and Bozell 1983) and the Walker Gilmore site (25CC28) in Cass County (Strong 1935), although fragmentary, showed no modifications or working by humans. The historic period remains from the Euro-American trading post operated by Lucien Fontenelle in northeastern Sarpy County were probably the result of subsistence hunting and could have originated anywhere within travel distance of the post (Bozell et al. 1990:30). The remains from the Hancock site (25DK14) in Dakota County consisted of two right mandibles that had been modified and polished (Frantz 1963). Gilder (1909:72) found five pronghorn mandibles near Bellevue in Sarpy County that had been modified to attach a handle and "having a higher polish than any other of the bone implements." These latter implements, like those from Dakota County, have been hypothesized to be used as a sickle or corn sheller. At the site north of Florence in Douglas County, Gilder (1907) recovered a pronghorn horn core and a small portion of attached cranium that had a hole drilled through it and a scapula that had been modified into a small hoe. The former object probably was used for ornamentation or for a sacred purpose and the latter clearly had a utilitarian purpose. In southwestern Sarpy County, at least one of several pronghorn bones found at the Patterson site (25SY31) had been modified (Bozell and Ludwickson 1999). Another site with numerous utilitarian objects produced from pronghorn bones was the Sweetwater site in Sherman County, where Champe and Bell (1936) recorded: "Ten complete bone awls made from the front metapodial or cannon bone of the antelope (*Antilocapra americana*) were found, and four fragments of awls."

At a majority of sites, pronghorns account for only a small portion of the faunal remains, with the minimum numbers of individuals being five or less at each site (Granger 1980; Semken and Falk 1987). At the vast majority of sites the remains of bison (*Bison bison*) far outnumber those of other game mammals, followed by deer (*Odocoileus* sp.) and elk (*Cervus elaphus*), with pronghorn usually the fourth most abundant. There may be several reasons for this ranking of pronghorns among the hunted game animals, including availability (size of local populations), palatability, and huntability (these weary and speedy animals would have been particularly difficult to hunt, especially before the introduction of the horse). However, there are at least two exceptions to this rule, including the oldest zone (7500–6000 BC) of the Lime Creek site (25FT41) in the southwestern part of the state, where beaver and pronghorn bones dominated, whereas in younger layers *Bison* bones were most abundant (Davis 1962). At the Hulme site (25HL28) pronghorn remains predominate, with a minimum of 306 individuals in addition to 248 individuals that were either pronghorn or deer. The site, which is located on an upland area in the Platte River drainage in western Hall County, dates from about 1250 AD. Pronghorn and deer (*Odocoileus* sp.) accounted for 66.2% of the identified mammalian remains, whereas the other large ungulates from the site, bison (*Bison bison*) and elk (*Cervus elaphus*), accounted for only 2.4% (Bozell 1991).

Historical Record

It appears that the first written record of a pronghorn (Fig. 2, Table 2) within the current boundaries of the state of Nebraska was by members of the Lewis and Clark expedition on September 3, 1804. The expedition at this point was passing up the Missouri River between Knox County, Nebraska, and Bon Homme County, South Dakota (Moulton 1987:44). That night the party camped on the Nebraska side of the river "at the edge of a Plain" that was probably near the western boundary of the present Santee Sioux Indian Reservation, east of the relocated town of Niobrara in Knox County (Moulton 1987:44–46). On September 14, 1804, when the party was well into present-day South Dakota, Captain Clark killed a pronghorn in Lyman County (Moulton 1987:71–72). Both Lewis and Clark described this individual in detail in their journals, which later probably formed part of Ord's scientific description of the species (Ord 1815).

Other early explorers (Brackenridge 1814; Bradbury 1819; Maximilian 1843; Luttig 1920) that primarily moved along the Missouri River did not encounter the species until the river turned northward into present-day South Dakota. It was not until 1843 that another explorer, James J. Audubon, noted the pronghorn along the Missouri River in extreme northeastern Nebraska (Audubon and Coues 1897:504). Later, it was Hayden (1862, 1875:95) who, based on his travels in 1856 and 1857, stated that the pronghorn occurred no farther south in this part of Nebraska than the "mouth of the Niobrara River."

Members of the Stephen H. Long expedition spent the winter of 1819–20 along the Missouri River at Engineer

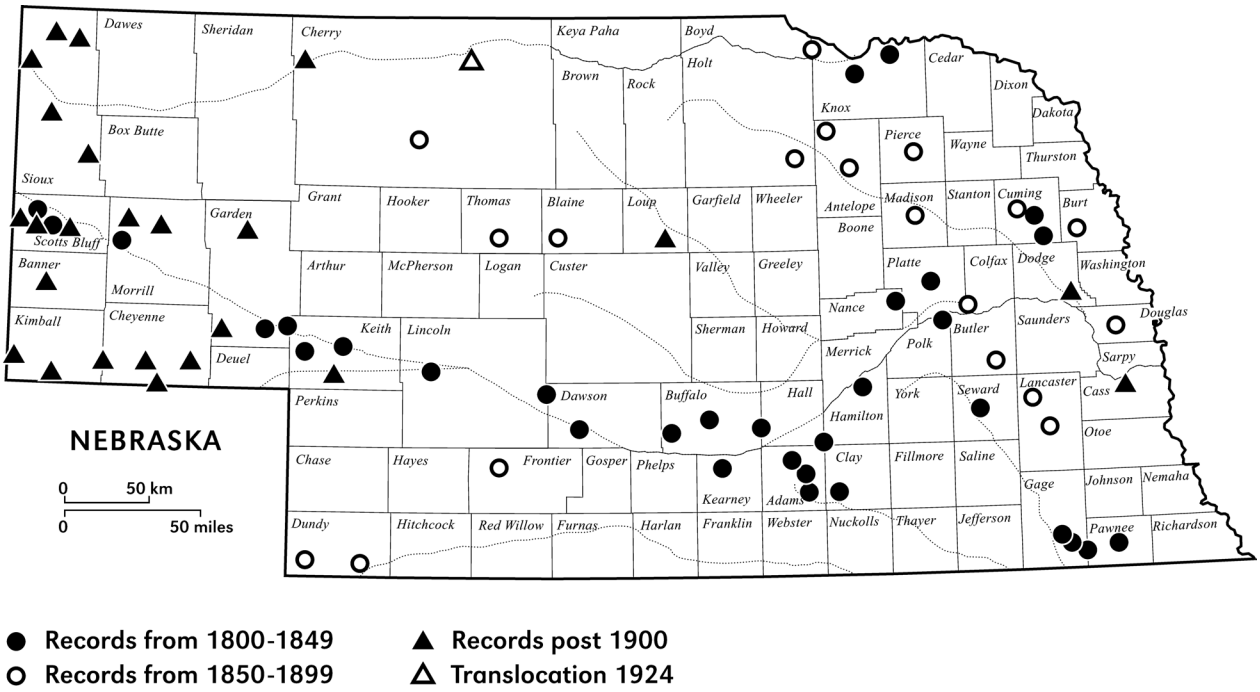

Figure 2. Location of historical records (1804 to 1958) of pronghorn (*Antilocapra americana*) in Nebraska.

Cantonment in southern Washington County, just north of Omaha in central eastern Nebraska. They did not encounter pronghorns until February 1820 when members of the expedition were exploring farther to the west along the Elkhorn River, probably in Cuming County (James 1823:191). Again in April, they observed pronghorns as they were visiting the Pawnee village in Nance County even farther to the west. Duke Paul (Paul Wilhelm 1973:332) observed pronghorns along the Elkhorn River where Plum Creek enters in central Cuming County in 1823. We believe that the record given by Jones (1964:324) for Engineer Cantonment in Washington County is incorrect because it was based on an erroneous reading of James (1823:370) (see Genoways and Ratcliffe 2008). The easternmost historical record that we have been able to locate in central eastern Nebraska is from the vicinity of the town of Elkhorn in western Douglas County. This record is based on the observation of Lawrence Bruner, an early noted naturalist and professor at the University of Nebraska, that a few were reported on the high ground east of the Elkhorn River in Douglas County, or possibly in Sarpy County (Jones 1964:324).

In southeastern Nebraska, the easternmost record for the pronghorn appears to be the observation of Carleton (1943) made on August 19–20, 1844. As his party was traveling along a branch of the Big Nemaha River in Pawnee County, he sighted "six antelopes," and the following day, as they progressed farther to the west and into Gage County, he noted that they saw "a great many antelope" during their day's journey.

Examination of the remainder of the records in Table 2 supports the idea that pronghorns occurred historically in all other areas of the state. However, by 1849, Captain Howard Stansbury already was noting that hunting was poor along the Little Blue River valley because of "the game having been driven from the vicinity of the traveled route by the unintermitted stream of emigration which had already passed over the road" (Stansbury 1852). Subsistence hunting along the various emigrant trails, such as the Oregon, Mormon, and Deadwood Trails, had a negative impact on populations of pronghorns and other game species. Beyond need-based hunting, however, was the impact of the "slaughter every day, from the mere wantonness and love of killing, the greenhorns glorying in the sport, like our stripling of the city, in their annual murdering of robin and sparrows," noted naturalist John Townsend as he journeyed along the Platte River in 1834 (Townsend 1839). Both C. Irvine and John A. MacMurphy remarked on the deadly impact of the weather during the winter of 1856–57, which began "with deep snow about December 1 of nearly four feet, ending with a blizzard" (Irvine 1902:158). As the result of starvation and killing by Native and pioneer hunters during this winter, "[t]he bones of elk, antelope, deer and buffalo were numerous

TABLE 2
SEVENTY-EIGHT HISTORICAL AND MUSEUM RECORDS OF PRONGHORN (*ANTILOCAPRA AMERICANA*) IN NEBRASKA

Reference	Date of record	Location in Nebraska	Comments
Moulton 1987:44	September 3, 1804	Probably near the western boundary of the present Santee Sioux Indian Reservation, east of relocated town of Niobrara, Knox County.	"Several wild Goats Seen in the Plains they are wild & fleet"
James 1823:191	February 1820	Elkhorn River, possibly Cuming County	"Saw a few bisons and antelopes and Elks"
James 1823:348	April 23, 1820	"Beaver creek," possibly Nance County	"In this vicinity several antelopes (*Cervicapra americana*, Ord) were seen by the party"
James 1823:433	June 9, 1820	Platte County	"Seen no game except a few antelope"
James 1823:454	June 15, 1820	Hall–Buffalo Counties	"Some antelopes were seen during the day"
James 1823:456	June 16, 1820	Buffalo County	"Two of the hunters . . . bringing in a buck antelope"
James 1823:456	June 17, 1820	Near Odessa, Buffalo County	Herd seen at a distance from which Lt. Swift shot a buck
James 1823:462	June 20, 1820	Dawson–Lincoln Counties	Mr. Peale killed an antelope and others killed two antelope "all at a distance from camp."
Paul Wilhelm 1973:332	August 11, 1823	Along Elkhorn River in central Cuming County	"Toward evening we encountered our first antelopes. The French Creoles call it *cabril*, also *cabris*."
Townsend 1839:45	May 15, 1834	Along Blue River, probably Gage County	"We saw to-day several large white wolves, and two herds of antelope."
Townsend 1839:47	May 18, 1834	Along south side of Platte River near Grand Island, probably Adams County	"Wolves and antelope were in great abundance here."
Townsend 1839:49	May 20, 1834	Along south side of Platte River, probably Dawson County	"The antelopes are very numerous here. There is not half an hour during the day in which they are not seen."
Townsend 1839:67	May 27, 1834	Along North Platte River, probably Keith County	"A few elk and antelopes"
Townsend 1839:68	May 28, 1834	Keith–Garden Counties	One pronghorn killed
Townsend 1839:69	May 30, 1834	Along south side of North Platte River near Mitchell, Scotts Bluff County	"One of our men caught a young antelope."
Frémont 1845:13	June 20, 1842	Near Big Blue River in southern Gage County	"To-day antelope were seen running over the hills."
Frémont 1845:45	June 24, 1842	On hills above Little Blue River, Clay County	"Now and then an antelope bounded across our path."
Frémont 1845:16	June 26, 1842	Between Little Blue River and Platte River, Adams County	"Antelope were seen frequently during the morning."
Audubon and Coues 1897:504	May 21, 1843	Poncas Island, Knox County	"Three Antelopes were seen this evening."
Carleton 1943:35	August 19, 1844	Pawnee County	Six antelopes sighted
Carleton 1943:39-40	August 20, 1844	Pawnee–Gage Counties	Saw "a great many antelope" during day's ride.
Carleton 1943:49	August 24, 1844	Seward County	"Nine antelope were also seen to-day."
Carleton 1943:59	August 28, 1844	In northeastern Polk County, in valley of Platte River	"Saw a great many antelopes."
Carleton 1943:194	May 27, 1845	Hamilton County	"Antelopes were seen from time to time."
Carleton 1943:199	May 29, 1845	Hamilton–Adams Counties	Several . . . of these animals we have seen this afternoon."
Carleton 1943:205	June 1, 1845	Kearney County	"Two fine antelopes . . . were aroused by the noise of our column."
Carleton 1943:216	June 4, 1845	Along South Platte River just west of confluence with North Platte River, Lincoln County	One killed during bison hunt

TABLE 2 continued

Reference	Date of record	Location in Nebraska	Comments
Carleton 1943:223	June 7, 1845	On divide between North and South Platte Rivers, Keith County	"During the afternoon we saw a great many buffaloes, antelope, and white wolves."
Carleton 1943:226	June 8, 1845	Ash Hollow, Garden County	"Emigrants sent the Colonel a fine large antelope this morning."
Carleton 1943:241	June 11, 1845	Near base of Scotts Bluff, Scotts Bluff County	"A young antelope sprang out of the grass"
Stansbury 1852:28	June 17, 1849	Valley of Little Blue River, probably Adams County	Among animals brought in was "one miserably poor little antelope."
Stansbury 1852:50	July 8, 1849	North Platte valley near Chimney Rock, Morrill County	"They had killed three elk and an antelope"
Bryan 1857:473	September 25, 1856	Along the Republican River, near Benkelman, Dundy County	"To-day we have again reached the region of game, buffalo and antelope having been killed."
National Museum of Natural History	1857	"Platte River" probably near the mouth of the Loup River, Platte–Colfax Counties	Catalog numbers 3447, 3454, 3460, 3461
Hayden 1862:150	1850s	Knox–Boyd Counties	No pronghorns seen "below the mouth of the Niobrara river"
Jones 1964:324	1856–1864	Vicinity of Elkhorn River, Douglas County	From Swenk manuscript
Dunlap 1898:54	June 15, 1866	Northwestern Lancaster County	"We saw the first antelope."
Dunlap 1898:55	June 16, 1866	Near Dwight, Butler County	"The ranchman's name is David Reed. He had just killed an antelope."
Jones 1964:324	1867–1868	"Logan Creek flats" west of Oakland, Burt County	From Swenk manuscript
Jones 1964:324	1867–1869	Plum Creek, east of Wisner, Cuming County	From Swenk manuscript
Hardy 1902:210	Early 1870s	Lancaster County	"The buffaloes had all been driven west of the Blue river. . . . Wolves, deer, and antelope were often seen."
Cary 1905:14-15	1877	Near Neligh, Antelope County	"A doe . . . shot on the river bottom just south of the town"
Cary 1905:15	1878	Verdigris Creek, northern Antelope County	"Another was killed"
Jones 1964:324	1870s	Madison County	From Swenk manuscript
Cary 1905:14	Fall 1880	Between North Fork of Elkhorn River and Dry Creek, about 18 miles north of Norfolk, in Pierce County	"A band of five antelope ranging the country . . . and killed one"
Cary 1905:14	Fall 1881	Cache Creek, south of Ewing, Holt County	"Killed five"
Jones 1964:324	1888	Dismal River, south of Thedford, Thomas County	From Swenk manuscript
Jones 1964:324	Late 1880s/early 1890s	West of Curtis, Frontier County	From Swenk manuscript
Cary 1905:15	1893	Between Brewster and Dunning, Blaine County	"Killed one"
Jones 1964:324	1896	North of Haigler, Dundy County	From Swenk manuscript
Cary 1905:14	1890s	South of Snake River, Cherry County	"Until a few years ago a small herd roamed south of the Snake River"
Cary 1905:15	1900	Western edge of Cherry County	"Saw a band of a dozen antelope"
Cary 1902:68, 1905:13	Summer 1901	Hat Creek Basin, northern Sioux County	"Confined to a small area of the Hat Creek Basin"
Swenk 1908:75	Summer 1906	Nebraska-Wyoming state line west of Harrison, Sioux County	"A small herd was present"
Swenk 1908:75	Fall 1906	Ogalalla, Keith County	"One was shot"
Wolcott and Shoemaker 1919:7	1918	Near Sidney, Cheyenne County	"A young one was observed"

TABLE 2 continued

Reference	Date of record	Location in Nebraska	Comments
Wolcott and Shoemaker 1919:7	1919	Nearly due west of Alliance, in Sioux County	Stationary band present
Wolcott and Shoemaker 1919:7	1919	Near Crescent Lake, Garden County	Stationary band present
Nelson 1925:37	1920–1921	Along North Platte River north of Bridgeport, Morrill County	"A band of about 40 antelope"
Grinnell 1929:135	December 1921	Near Louisville, Cass County	"An Omaha newspaper item, December 28, 1921, tells of an antelope being seen."
Nelson 1925:37	1922	Banner County	There was a band of antelope present
Nelson 1925:37	1922	Scotts Bluff County	There was a band of antelope present; secured conviction for killing an antelope
Nelson 1925:37	*1922*	*33 Ranch, Sioux County*	*"A band of about 12"*
Nelson 1925:38	1922	Near Agate, Sioux County	"A band of about 25"
Nelson 1925:38	1922	About 10 miles west of Bushnell, Kimball County	"A band of about 5"
Nelson 1925:38	1922	Near state line south of Kimball, Kimball County	"Band of 5"
Nelson 1925:38	1922	Between Dix and Potter, Cheyenne-Kimball Counties	"A band of 14"
Nelson 1925:38	1922	About 18 miles south of Sidney, Cheyenne County	"A band of about 40"
Nelson 1925:38	Spring 1922	Near Sunol, in eastern Cheyenne County	"A band of 43 was reported . . . as grazing in fields"
Nelson 1925:38	1922	About 12 miles south of Lisco, Garden County	"A band of 25"
Nelson 1925:38	1924	About 15 miles north of Sargent, in Loup County	"A band of 8"
Nelson 1925:38	September 1924	Fort Niobrara, National Wildlife Refuge, Cherry County	"Ten young antelope, 6 females and 4 males, were placed on the Niobrara Game Reservation. . . . These antelope were part of the fawns captured in northwestern Nevada."
Grinnell 1929:138	1927–1928	Not very far from Scottsbluff, Scotts Bluff County	"Two small bands estimated as about forty in all."
Grinnell 1929:135	1920s	A very few miles west of Fremont, Dodge County	"Saw a wild antelope"
National Museum of Natural History	1932	Signal Butte, Scotts Bluff County	Catalog number 257916
Leister 1932:187	*1932*	*Fort Niobrara, National Wildlife Refuge, Cherry County*	*"13 are on the Niobrara Reservation"*
H. Genoways, personal observations	Mid-1940s	Good Streak Township, northwestern Morrill County	Single pronghorn and small group up to five regularly observed
University of Nebraska State Museum	1957	7 miles northwest of Orella, Sioux County	Catalog number 12189, 12190

Notes: Records are arranged in chronological order based on the date of the observation. One locality set in italics could not be located and the other duplicates an earlier locality. See Figure 2 for map of locations of records.

on the prairie. It seems to me as if every forty acres must have had at least one skeleton or a portion of the remains of these animals" (MacMurphy 1894:17).

Samuel Aughey (1880) wrote about pronghorns in the late 1870s: "It was formerly common to meet these on the prairie in herds of 20 to 500. Only a few years ago it was yet common to meet herds of hundreds of these beautiful and graceful animals in Central and Western Nebraska. They are now mostly confined to the northern and western portions of the State."

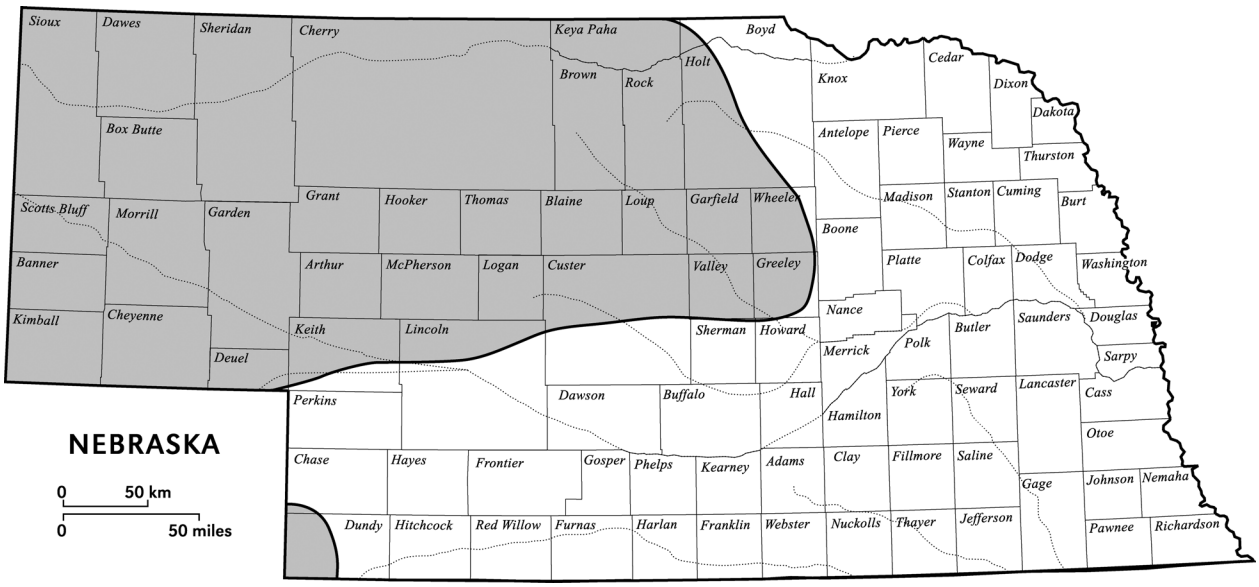

Figure 3. Current distribution (shaded area) of pronghorn (*Antilocapra americana*) in Nebraska.

Through the 1880s and 1890s there are scattered reports of pronghorns, primarily from the northern areas of the state and the Sandhills. Near the end of the 19th century, Grinnell (1897) was able to document only scattered populations in extreme northwestern and southwestern corners of the panhandle of Nebraska, although C. Hart Merriam just a few years later mapped the geographic range of pronghorns covering as much as the western third of the state (Roosevelt et al. 1902). Cary (1902, 1905) believed that the species was essentially extirpated from the state by the time he undertook his studies in northern Sioux County in the summer of 1901, although he saw sign of some individuals in Hat Creek Basin. Hornaday (1904) showed possible herds in extreme northwestern Nebraska, probably based on Cary's (1902) observations. Although pronghorns were almost extirpated from the state, scattered records of individuals and small herds were documented over the next two decades (Table 2), all confined to the panhandle of Nebraska. However, Hornaday (1914) in his survey of pronghorn populations throughout its geographic range mapped no herds in Nebraska. Nebraska gave pronghorns full protection in 1907, which helped to keep the species from becoming extinct in the state (Jones 1964).

E. W. Nelson (1925) presented the results of a comprehensive survey of pronghorns conducted between 1922 and 1924 by the U.S. Biological Survey. This survey identified nine herds of pronghorns in Nebraska occurring in five counties. These herds were estimated to contain a total of 187 individuals. Four of these counties—Cheyenne, Garden, Kimball, and Sioux—were in the panhandle, with the first three located adjacent to or near the Colorado state line and the last two adjacent to Wyoming. The other herd of eight individuals was located in southeastern Loup County, probably near the town of Taylor in the eastern Sandhills. The survey also received reports of pronghorns in Banner, Morrill, and Scotts Bluff Counties, all in the panhandle, but no herds were documented. Nelson (1925) also documented the translocation of 10 young pronghorns from northwestern Nevada to the Fort Niobrara National Wildlife Refuge in Cherry County in 1924 by members of the Biological Survey.

Grinnell (1929) reported single pronghorns from Cass and Dodge Counties in eastern Nebraska during the 1920s, but Jones (1964) questioned the record from Dodge County. There is little documentation on the development of pronghorn populations during the 1930s and 1940s, but by 1953, there were sufficient numbers for the beginning of a hunting season. As noted by Jones (1964), these pronghorn populations developed and increased in the panhandle counties of Nebraska.

Current Distribution

The current distribution of pronghorns in Nebraska closely resembles that presented in Figure 3. The primary range of pronghorns is concentrated in the panhandle and Sandhills of Nebraska, with small populations occurring in the southwest portion of the state. Occasionally, sightings of pronghorns beyond the geographic range limits

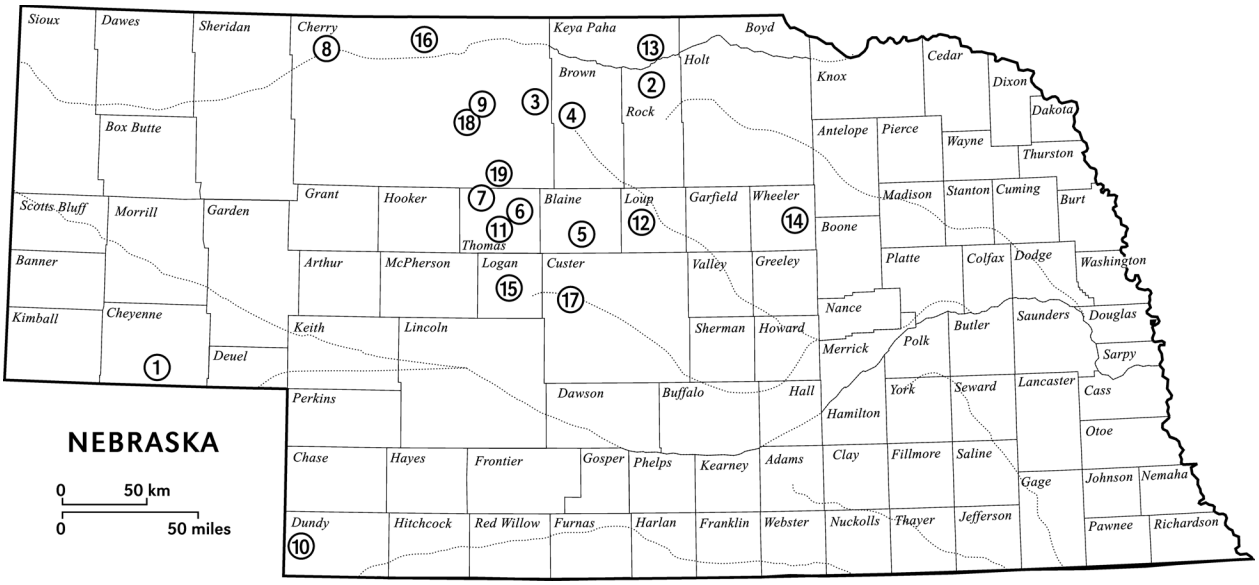

Figure 4. Release sites of pronghorn (*Antilocapra americana*) in Nebraska. Numbers within the circles correspond to release sites listed in Table 3.

depicted in Figure 3 have been observed, especially in northeastern and south-central Nebraska. However, these individuals are not thought to be part of established, reproductive herds.

The current distribution of pronghorn in Nebraska was undoubtedly aided by certain management practices, specifically reintroduction programs. Trapping of pronghorn first took place in January 1958 and continued until February 1962. In the initial trapping session, 63 individuals were taken from the Pueblo Ordnance Depot, Pueblo County, CO. A total of 36 pronghorn were released in Rock County, NE, and 27 pronghorns were released in the Sioux Ordnance Depot, Cheyenne County, NE (Fig. 4, Table 3). After the initial trapping session, all other pronghorns were trapped in western Nebraska and released throughout the Sandhills (Fig. 4, Table 3). Release sites were chosen based upon a cooperative agreement between landowners and the NGPC and the overall suitability of the habitat. A total of 1.6 million acres of Sandhills habitat were signed up under the agreements.

DISCUSSION

The archeological and paleontological records provide some insight into the early distribution of pronghorns in Nebraska and indicate that this species has a history of at least 20,000 years of occurrence within the boundaries of the current state. Although the archeological and paleontological records do not provide equal coverage to all parts of the state, these data (Fig. 1, Table 1) are sufficient to show that pronghorns were statewide in distribution throughout much of the species' history in the state. Holocene records appear to confirm that pronghorns occurred in the easternmost counties of Nebraska for at least the last 6,000 years. There are records from six counties along the Missouri River south of the mouth of the Niobrara River. The complication of interpreting these records is that only the two from Burt and Cass Counties apparently were based on bone that was not modified into utilitarian or ceremonial/decorative objects.

Early authors (Cary 1905; Swenk 1908, 1915; Wolcott and Shoemaker 1919) writing about mammals of Nebraska during historic times (after 1800) considered the pronghorn to have been statewide in its original distribution. However, Jones (1964:321) believed that the geographic range of the pronghorn did not reach the Missouri River in Nebraska except in the extreme northeastern part of the state, its eastern distribution being "sharply limited by the forested areas bordering the Missouri River." These counties contained the largest tracts of eastern deciduous forest in Nebraska before Euro-American settlement (Kaul and Rolfsmeier 1993). Lewis and Clark did not encounter pronghorns until they reached the area near the mouth of the Niobrara River (Moulton 1987) in Knox County. Early expeditions in southeastern Nebraska crossing Johnson, Otoe, Nemaha, and Richardson Counties did not document pronghorns until they reached farther west in more prairie-dominated regions of western Cass, Pawnee, and Gage Counties (Carleton 1943).

TABLE 3
SUMMARY OF RELEASE SITE, RELEASE DATE, AND NUMBER OF PRONGHORN RELEASED IN NEBRASKA

Site no.	County	Locality	Date	Number of pronghorn		
				Males	Females	Total
1	Cheyenne	Sioux Orndance Depot	January 25, 1958	10	17	27
2	Rock	23 miles south of Newport	January 11, 1959	13	23	36
3	Cherry	16 miles south of Wood Lake	January 16, 1959, and February 2, 1960	31	40	71
4	Brown	10 miles south of Johnstown	January 23, 1959, and February 3, 1959	7	21	28
5	Blaine	15 miles east of Dunning	December 3, 1959	28	33	61
6	Thomas	10 miles northwest of Halsey	December 7, 1959	11	37	48
7	Thomas	11 miles northwest of Thedford	December 9, 1959	22	22	44
8	Cherry	5 miles southwest of Merriman	January 7, 1960	24	26	50
9	Cherry	3 miles east of Kennedy	February 8, 1960	14	32	46
10	Dundy	16 miles north of Haigler	January 13, 1960	33	28	61
11	Thomas	Halsey National Forest	January 27, 1960	24	48	72
12	Loup	16 miles north of Almeria	January 28, 1960	23	38	61
13	Keya Paha	24 miles east of Springview	February 3, 1960	21	20	41
14	Wheeler	12 miles southeast of Cumminsville	January 20, 1960, and February 3, 1961	15	65	80
15	Logan	16 miles north of Stapleton	December 2, 1960	44	68	112
16	Cherry	South of Cody	December 10, 1960, and January 6, 1961	42	75	117
17	Custer	15 miles northeast of Arnold	January 12, 1961	17	40	57
18	Cherry	Valentine National Refuge	February 15, 1961	30	22	52
19	Cherry	7 miles north of Thedford	February 22, 1962	13	29	42

Note: Numbers correspond to locations shown in Figure 4.

We believe these historical records confirm Jones's (1964) observation that pronghorns did not reach the Missouri River in Nebraska except in Boyd and Knox Counties in the northeast. If the easternmost historical records are connected by an imaginary line, it would appear that pronghorns did not occupy the easternmost counties along the Missouri River. Jones (1964) hypothesized that pronghorns were not in this area because of

the forests bordering the Missouri River. We disagree, at least in part, with this idea because the forest in the area of eastern Nebraska along the Missouri River was historically very limited and fragmented (Genoways and Ratcliffe 2008). We believe that in addition to the trees, and more importantly, tallgrass prairie restricted the occurrence of pronghorns in eastern Nebraska. Grinnell (1897:5) observed that "the antelope never seemed to like the tall grass." Given that the survival strategy of pronghorns is based on sight and flight, both of which would be impeded by the tallgrass prairie, this seems a logical conclusion.

The pronghorns' avoidance of eastern forests and tallgrass prairie is further confirmed by the paucity of records of pronghorns in Iowa and Missouri. Grinnell (1897) could not document any occurrences of pronghorns in Iowa, but Jones (1960) presented historical records based on sightings of pronghorns made in 1850 near the Little Sioux River in Harrison and Monona Counties. Bowles (1970, 1975) reviewed all information available on pronghorns in Iowa and found general historical accounts in several counties in western Iowa, but the only definite sighting was that reported by Jones (1960). The Holocene record in Iowa is restricted to two sites, including the Hanging Valley site in northwestern Harrison County (Tiffany et al. 1988: 229, 238–39) and the Arthur site (13DK27) in Dickenson County (Semken 1982). The Hanging Valley site (AD 190–700) is near the mouth of the Little Sioux River into the Missouri River across from Tekamah in Burt County, NE, and the Arthur site (AD 650–950) is on East Okoboji Lake near the drainage of the Little Sioux River far to the north, close to the Minnesota state line south of Jackson in Jackson County. The pronghorn material from Hanging Valley consists of two partial crania, with one appearing "to have been coated with red pigment after the horn was removed from the horncore" (Tiffany et al. 1988:229). At the Arthur site the evidence for pronghorn is more equivocal, as Semken (1982:130) only tentatively assigned a metapodial fragment as "an artiodactyl the size of a pronghorn."

The situation in Missouri seems to be similar to that in Iowa. McKinley (1960:504) studied the historical references to the pronghorn in the state and concluded: "These county history references are uncertain as to the time and place, and are not sufficiently elaborated in personal narratives to be accepted with assurance." There are two archeological records of the pronghorn, but only one of these, Brynjulfson Cave No. 2, is east of the Missouri River at a place six miles south–southeast of Columbia in Boone County (Parmalee and Oesch 1972). This record is based on two isolated teeth that date to approximately 510 BC. The other site, which is south and west of the Missouri River, is the Rodgers Shelter in Benton County along the western edge of the Ozark Highlands. The three pronghorn molars recovered from the site cover the time from 6200 BC to 500 BC (Parmalee et al. 1976).

Our conclusion based on the evidence at hand is that the eastern boundary of the geographic distribution of the pronghorn south of the Niobrara River in Nebraska at the beginning of the 19th century was along the western perimeter of the eastern deciduous forest and tallgrass prairie. This would have excluded most of the easternmost tier of counties in the state. This geographic arrangement persisted throughout most of the Holocene; its boundary was never a straight line but a dynamic system of fluctuating distribution. At times, because of shifting climatic or environmental changes, such as prairie fires or decreased rainfall, short- and midgrass prairies penetrated to the east of the Missouri River, and the pronghorn followed these habitats, but the record indicates that these forays did not persist through time. Therefore, as Euro-Americans entered Nebraska, pronghorns were relatively abundant and were widespread in distribution, occurring anywhere that shortgrass and midgrass prairies were present.

Although Zebulon Pike when he briefly visited south-central Nebraska in 1806 (Coues 1895) did not note the presences of pronghorns, many early historical records are concentrated along the Big Blue, Little Blue, and central Platte Rivers in this area. These areas were along the route of the emigrant trails heading to the western United States. There also are a number of records of pronghorn from along the North Platte River, as these trails followed that valley of the river to the current border between Nebraska and Wyoming. The concentration of historical records (Fig. 2, Table 2) seems to be in the midgrass and mixed-grass prairies along the Elkhorn River and the Platte River from the mouth of the Loup River to about the location of the modern town of Cozad in Dawson County. Whether or not this is an artifact of the historical record or was the area of highest pronghorn populations cannot be determined with the information at hand. Although some recent authors (Walker 2000; Shaw and Lee 1997) claim that pronghorns are primarily adapted to the shortgrass prairie, the affinity of pronghorns for the midgrass prairie should be considered as one examines the historical records from other areas of the Great Plains.

By 1850, pronghorn numbers were declining noticeably in Nebraska. This trend also was apparent elsewhere in the geographic range of the pronghorns, as Sexson and

Choate (1981) documented that pronghorn populations were declining in eastern and central Kansas during this same period. Almost certainly sport and subsistence hunting continued to place pressure on the pronghorn populations, but also the settlement of the land was restricting and fragmenting the habitat available to the species. Farms of 160 acres were being established and the prairie was plowed for the growing of row crops. Cattle and sheep ranchers negatively affected pronghorn populations by erecting fences and shooting pronghorns because they potentially competed with domestic animals for food. The populations of pronghorns continued to retreat to the west so that the only reproducing herds were confined to the panhandle region. These events led many to believe that the pronghorn had been extirpated from the state (Cary 1902, 1905; Hornaday 1914) by the beginning of the 20th century, but apparently the species was never extirpated from Nebraska (Roosevelt et al. 1902). The reproduction of these local populations probably aided the increase in numbers in the first half of the 20th century, but undoubtedly the increase was enhanced by emigration of herds from the adjoining states of Colorado and Wyoming where populations were estimated to be 2,000 and 25,000, respectively, in 1932 (Leister 1932). The shortgrass Sandhills prairies in the panhandle are considered favorable habitat, but pronghorns were absent from the areas due to intensive cultivation (i.e., in the North Platte River valley). Pronghorns clearly favored areas of open grassland pastures and large, unfenced fields planted to winter wheat.

There is a marked difference in the current distribution of pronghorn in Nebraska compared to distribution based on archeological and historical records. While the latter suggests that pronghorns possessed a near statewide distribution, the current distribution shows that pronghorns are restricted to areas of the panhandle and Sandhills of Nebraska. Since the early 1900s, pronghorns have been recolonizing parts of their historic range, which can be attributed in large part to management strategies implemented by the Nebraska Game and Parks Commission.

Harvest of Nebraska pronghorn was banned in 1907. Pronghorns responded favorably to the lack of hunter harvest, and in 1953 a hunting season was reimplemented in western Nebraska, primarily in Sioux and Dawes Counties. Prior to 1958, pronghorns were restricted to portions of the western and southern panhandle. The process of pronghorns' natural dispersal and colonization of unoccupied areas of suitable habitat was extremely slow, probably for several reasons, including distance to be traveled, habitat fragmentation, and fencing. To facilitate the return of pronghorns to unoccupied portions of their historic range in Nebraska, the NGPC implemented a pronghorn relocation program (Mathisen 1958). One of the areas selected for colonization was the Nebraska Sandhills, which was part of the historic range of the pronghorn (Figs. 1 and 2). The Sandhills is an ecoregion of approximately 20,000 square miles comprised of sharply rolling hills, sandy soils, and short- and mixed-grass prairies with an abundance of native forbs. Because of the soil characteristics, early attempts to cultivate this area by settlers generally were unsuccessful, resulting in primarily undisturbed habitat that was highly suitable for pronghorns. Therefore, between 1958 and 1962 the relocation program conducted by the Nebraska Game and Parks Commission moved 1,106 pronghorns into suitable habitat areas of the Sandhills. Most areas of the Sandhills currently possess reproducing populations of pronghorn, and pronghorn hunting seasons have also been established in these areas.

In conclusion, the distribution of pronghorn in Nebraska has experienced significant changes in the past 20,000 years. The paleontological record suggests that pronghorns were found statewide in Nebraska. At the beginning of the 19th century, the distributional limit of pronghorn in Nebraska had retreated to the western edge of the deciduous forest and tallgrass prairie habits. By the mid-19th century populations of pronghorn were declining throughout the state, most likely the result of increased harvest and habitat fragmentation by European settlers. At the beginning of the 20th century, pronghorns were restricted to small areas of native prairie in extreme northwestern Nebraska. The restriction of pronghorn hunting in 1907 allowed populations to slowly increase, and the implementation of a relocation program in 1958 greatly increased the distribution of pronghorn in Nebraska. Presently, pronghorn possess stable populations throughout nearly half the state and are considered an important game animal. As long as the pronghorn continue to be managed, their status as an important member of Nebraska's fauna should be secure.

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REFERENCES

Adair, M.J., and K.L. Brown, eds. 1987. *Prehistoric and Historic Cultural Resources of Selected Sites at Harlan County Lake, Harlan County, Nebraska: Test Excavations and Determination of Significance for 28 Sites.* Kaw Valley Engineering and Development, Inc., Junction City, KS, and Parkville, MO.

Agenbroad, L.D. 1978. *The Hudson-Meng Site: An Alberta Bison Kill in the Nebraska High Plains.* University Press of America, Washington, DC.

Audubon, M.R., and E. Coues. 1897. *Audubon and His Journals*, vols. 1 and 2. Charles Scribner's Sons, New York. Reprint, Dover Publications, Mineola, NY, 1986.

Aughey, S. 1880. *Sketches of the Physical Geography and Geology of Nebraska.* Daily Republican Book and Job Office, Omaha, NE.

Bamforth, D.B. 2002. The paleoindian occupation of Medicine Creek drainage, southwestern Nebraska. In *Medicine Creek: Seventy Years of Archaeological Investigations*, ed. D.C. Roper, 54–83. University of Alabama Press, Tuscaloosa.

Bowles, J.B. 1970. Historical record of some Iowan mammals. *Transactions of the Kansas Academy of Science* 73:419–30.

Bowles, J.B. 1975. Distribution and biogeography of mammals of Iowa. *Special Publications of the Museum, Texas Tech University* 9:1–184.

Bozell, J.R. 1991. Fauna from the Hulme site and comments on Central Plains tradition subsistence variability. *Plains Anthropologist* 36:229–53.

Bozell, J.R. 1993. Vertebrate remains from 1991 archeological investigations at Agate Fossil Beds National Monument, Sioux County, Nebraska. In *Archeological Survey and Testing at Agate Fossil Beds National Monument, Sioux County, Nebraska*, ed. C.P. Clark, 59–82. National Park Service, Midwest Archeological Center, Technical Report 22:1–82.

Bozell, J.R. 1994. Vertebrate remains from select 1991 and 1992 archeological investigations at Agate Fossil Beds National Monument, Sioux County, Nebraska. In *Archeological Investigations on Marsland Road, Agate Fossil Beds National Monument, Sioux County, Nebraska,* ed. C.P. Clark, 45–63. National Park Service, Midwest Archeological Center, Technical Report 31:1–63.

Bozell, J.R., S. Donnelly, M. Rogers, and S. Zink. 1990. Animal utilization at two nineteenth century trading posts in east central Nebraska. Report on file at the Nebraska State Historical Society, Lincoln.

Bozell, J.R., and J. Ludwickson. 1988. *Highway Archeological Investigations at the Slaughterhouse Creek Site and Other Cultural Resources in the Pine Ridge Area*. Nebraska State Historical Society, Report for the Nebraska Department of Roads, Lincoln.

Bozell, J.R., and J. Ludwickson. 1999. Archeology of the Patterson Site: Native American life in the Lower Platte Valley, AD 1000–1300. Nebraska State Historical Society, Report for the Nebraska Department of Roads and Federal Highway Administration, Lincoln.

Bozell, J.R., and M.K. Rogers. 1989. A Great Oasis fauna from central Nebraska. *Central Plains Archaeology* 1:3–36.

Bozell, J.R., L.M. Snyder, and C.R. Falk. 1982. Descriptive analysis of unmodified vertebrate remains recovered from the Schuyler site (25CX1), Colfax County, Nebraska. Division of Archeological Research, Department of Anthropology, University of Nebraska–Lincoln, Technical Report 82-06.

Brackenridge, H.M. 1814. *Views of Louisiana; Together with a Journal of a Voyage Up the Missouri River, in 1811.* Cramer, Spear and Eichbaum, Pittsburgh. Reprint, "A Journal of a Voyage Up the Missouri River, in 1811," 199–268, Readex Microprint Corporation, 1966.

Bradbury, J. 1819. *Travels in the Interior of America, in the Years 1809, 1810, and 1811; Including a Description of Upper Louisiana, Together with the States of Ohio, Kentucky, Indiana, and Tennessee, with Illinois and Western Territories, Containing Remarks and Observations Useful to Persons Emigrating to Those Countries.* 2nd ed. Sherwood, Neely, and Jones, London. Reprint, University of Nebraska Press, Lincoln, 1986.

Bryan, F.T. 1857. Appendix H to No. 11. Report of the Chief Topographical Engineer. In *Report of the Secretary of War (J. B. Floyd, Secretary of War), Message from the President of the United States, to the Two Houses of Congress at the Commencement of the First Session of the Thirty-fifth Congress*, 2:455–520. Cornelius Wendell Printer, Washington, DC.

Carleton, J.H. 1943. *The Prairie Logbooks: Dragoon Campaigns to the Pawnee Villages in 1844, and the Rocky Mountains in 1845* [edited by L. Pelzer]. The Caxton Club, Chicago. Reprint, Bison Books, University of Nebraska Press, Lincoln, 1983.

Carlson, G.F. 1973. Archeological salvage and survey in Nebraska, Part I: Highway archeological and historical salvage investigations in Nebraska, 1965 to 1968. *Nebraska State Historical Society, Publications in Anthropology* 5:1–155.

Cary, M. 1902. Some general remarks upon the distribution of life in northwest Nebraska. *Proceedings of the Nebraska Ornithological Union* 3:63–75.

Cary, M. [1905]. The mammals of Nebraska. Handwritten manuscript held by U.S. Fish and Wildlife Service, Washington DC.

Champe, J.L. 1946. Ash Hollow cave: A study of stratigraphic sequence in the central Great Plains. *University of Nebraska Studies* 1 (n.s.): 1–30.

Champe, J.L., and E.H. Bell. 1936. The Sweetwater Culture complex. In *Chapters in Nebraska Archaeology*, ed. E.H. Bell, 249–99. University of Nebraska, Lincoln.

Chorn, J.D., B.A. Frase, and C.D. Frailey. 1988. Late Pleistocene pronghorn, *Antilocapra americana*, from Natural Trap cave, Wyoming. *Transactions of the Nebraska Academy of Sciences* 16:127–39.

Corner, R.G. 1977. A Late Pleistocene-Holocene vertebrate fauna from Red Willow County, Nebraska. *Transactions of the Nebraska Academy of Sciences* 4:77–93.

Coues, E., ed. 1895. *The Expeditions of Zebulon Montgomery Pike, to Headwaters of the Mississippi River, through Louisiana Territory, and in New Spain, during the Years 1805–6–7.* F.P. Harper, New York.

Davis, E.M. 1962. Archeology of the Lime Creek site in southwestern Nebraska. *Special Publication of the University of Nebraska State Museum* 3:1–106.

Dunlap, J.P. 1898. Travels in Nebraska in 1866. *Proceedings and Collections of the Nebraska State Historical Society* 2 (2nd ser.):53–57.

Falk, C.R. 1969a. Faunal remains; faunal evidence. In *Two House Sites in the Central Plains: An Experiment in Archaeolo*gy, ed. W.R. Wood, 44–51, 80–81, 102. Plains Anthropologist Memoir 6:1–132.

Falk, C.R. 1969b. Mowry Bluff artifacts: Faunal remains. In *Two House Sites in the Central Plains: An Experiment in Archaeology*, ed. W.R. Wood, 44–51. Plains Anthropologist Memoir 6:1–132.

Frantz, W. 1963. Four Aksarben sites in Dakota County, Nebraska. Unpublished master's thesis, University of Nebraska–Lincoln.

Frémont, J.C. 1845. *Report of the Exploring Expedition to the Rocky Mountains in the Year 1842, and to Oregon and North California in the Years 1843–44.* Blair and Rives, Printers, Washington, DC.

Genoways, H.H., and B.C. Ratcliffe. 2008. Engineer Cantonment, Missouri Territory, 1819–1820: America's first biodiversity inventory. *Great Plains Research* 18:3–31.

Gilder, R.F. 1907. Archeology of the Ponca Creek District, eastern Nebraska. *American Anthropologist* 9:702–19.

Gilder, R.F. 1909. Excavation of earth-lodge ruins in eastern Nebraska. *American Anthropologist* 11:56–84.

Graham, R.W., H.A. Semken, Jr., and M.A. Graham. 1987. Late Quaternary mammalian biogeography of the Great Plains and Prairies. *Scientific Papers, Illinois State Museum* 22:1–491.

Granger, R.T., Jr. 1980. Salvage archeology in the Red Willow Reservoir, Nebraska. *Nebraska State Historical Society, Publications in Anthropology* 9:1–236.

Grinnell, G.B. 1897. Range of the pronghorn antelope in 1896. *Forest and Stream* 48:5–6.

Grinnell, G.B. 1929. Pronghorn antelope. *Journal of Mammalogy* 10:135–41.

Gunnerson, D.A. n.d. [1956]. The Stanton site, 25ST1. Unpublished master's thesis, University of Nebraska–Lincoln, pages unnumbered, Nebraska State Historical Society, Lincoln.

Gunnerson, J.H. 1960. An introduction to Plains Apache archeology—The Dismal River Aspect. *Smithsonian Institution, Bureau of American Ethnology Bulletin* 173:131–260.

Hardy, H.W. 1902. Reminiscences. *Proceedings and Collections of the Nebraska State Historical Society* 5 (2nd ser.): 207–11.

Hayden, F.V. 1862. On the geology and natural history of the Upper Missouri. *Transactions of the American Philosophical Society* 12:1–218.

Hayden, F.V. 1875. Catalogue of the collections in geology and natural history, obtained by the expedition under the command of Lieut. G. K. Warren,

Topographical Engineers. In *Preliminary Report of Explorations in Nebraska and Dakota, in the Years 1855–'56–'57*, ed. G. K. Warren, 61–125. Government Printing Office, Engineer Department, U.S. Army, Washington, DC. Originally printed in the appendixes to the report of the secretary of war, in the President's Message and Documents, December 1858.

Hill, A.T., and G. Metcalf. 1942. A site of the Dismal River Aspect in Chase County, Nebraska. *Nebraska History* 22:158–226.

Hoffman, J.D., H.H. Genoways, and R.R. Jones. 2010. Factors influencing long-term population dynamics of pronghorns (*Antilocapra americana*): Evidence of an Allee effect. *Journal of Mammalogy* 91:1124–34.

Holder, P., and J. Wike. 1949. The Frontier Culture Complex, a preliminary report on a prehistoric hunters' camp in southwestern Nebraska. *American Antiquity* 14:260–66.

Hornaday, W.T. 1904. *The American Natural History.* Charles Scribner's Sons, New York.

Hornaday, W.T. 1914. *The American Natural History*. Charles Scribner's Sons, New York.

Hudson, J. 2007. Faunal evidence for subsistence and settlement patterns at the Allen Site. In *The Allen Site: A Paleoindian Camp in Southwestern Nebraska,* ed. D.B. Bamforth, 194–226. University of New Mexico Press, Albuquerque.

Irvine, C. 1902. Recollections of Omaha, 1855–61. *Proceedings and Collections of the Nebraska Historical Society* 5 (2nd ser.): 150–60.

James, E. 1823. *Account of an Expedition from Pittsburgh to the Rocky Mountains, Performed in the Years 1819 and '20, by Order of the Hon. J. C. Calhoun, Sec'y of War: Under the Command of Major Stephen H. Long, from the Notes of Major Long, Mr. T. Say, and Other Gentlemen of the Exploring Party*, vol. 1. H.C. Carey and I. Lea, Philadelphia. Reprint, Readex Microprint Corporation, 1966.

Jensen, R.J. 1973. Archeological salvage and survey in Nebraska, Part II: A preliminary report of the Point of Rocks Archeological Survey. *Nebraska State Historical Society, Publications in Anthropology* 5:159–240.

Jones, J.K., Jr. 1960. The pronghorn, *Antilocapra americana*, in western Iowa. *American Midland Naturalist* 63:249.

Jones, J.K., Jr. 1964. Distribution and taxonomy of mammals of Nebraska. *University of Kansas Publications, Museum Natural History* 16:1–356.

Kaul, R.B., and S.B. Rolfsmeier. 1993. *Native Vegetation of Nebraska*. Conservation and Survey Division, University of Nebraska–Lincoln.

Kivett, M.F. 1952. Woodland sites in Nebraska. *Nebraska State Historical Society, Publications in Anthropology* 1:1–102.

Kivett, M.F., and G.S. Metcalf. 1997. The prehistoric people of the Medicine Creek Reservoir, Frontier County, Nebraska: An experiment in mechanized archeology (1946–1948). *Plains Anthropologist* 42:1–218.

Koch, A. 2004. McIntosh: A late prehistoric occupation in the Nebraska Sand Hills. *Central Plains Archeology* 10:1–167.

Koch, A., and T. Nelson. 2002. Material recovered. In *Archeology of he Beaver Creek Site, Boone County, Nebraska*, ed. A. Koch, 19–108. Nebraska State Historical Society, Report to the Nebraska Department of Roads.

Leister, C.W. 1932. The pronghorn of North America. *Bulletin of the New York Zoological Society* 35:182–207.

Ludwickson, J. 1978a. Central Plains Tradition settlements in the Loup River Basin: The Loup River Phase. In *The Central Plains Tradition: Internal Development and External Relationships*, ed. D.J. Blakeslee, 94–108. Report no. 11, Office of the State Archaeologist, University of Iowa, Iowa City.

Ludwickson, J. 1978b. *Artifact Descriptions Midstate Survey.* Midstate Archaeological Survey, National Park Service.

Ludwickson, J., D. Blakeslee, and J. O'Shea. 1981. *Missouri National Recreational River: Native American Cultural Resources*. Report for Heritage Conservation and Recreation Service, Interagency Archeological Services, Denver.

Luttig, J.C. 1920. *Journal of a Fur-Trading Expedition on the Upper Missouri, 1812–1813*, ed. S.M. Drumm. Missouri Historical Society, St. Louis. Reprint, Argosy-Antiquarian Ltd., New York, 1964.

MacMurphy, J.A. 1894. Part of the making of a great state. *Proceedings and Collections of the Nebraska Historical Society* 1 (2nd ser.):3–24.

Mathisen, J. 1958. A reconnaissance of potential release sites for antelope. In *Job Completion Report, Pittman-Robertson Project W-15-R*, 476–85. Nebraska Game, Forestation, and Parks Commission.

Maximilian, Prince of Wied [H.E. Lloyd, translator]. 1843. *Travels in the Interior of North America, in the Years 1832, 1833, and 1834* [Part I]. Ackermann

and Co., London. Reprint, AMS Press, Inc., New York, 1966, of 1905 reprint edited by R.G. Thwaites in *Early Western Travels, 1748–1846* (Maximilian), 22:1–393. Arthur H. Clark Co., Cleveland.

McKenna, M.C., and S.K. Bell. 1997. *Classification of Mammals Above the Species Level*. Columbia University Press, New York.

McKinley, D. 1960. The question of the pronghorn in pioneer Missouri. *Journal of Mammalogy* 41:503–5.

Meadow, B., and J.K. Peterson. 2001. Unmodified and modified faunal remains. In *Central Plains Tradition at the Palmer Locality: Features and Artifacts from 25NC29*, ed. J.K. Peterson, S.R. Holen, and D.R. Watson, 154–77. Nebraska Archaeological Survey, University of Nebraska State Museum 2001-01.

Metcalf, G. 1941. The Hill-Rupp (or Monroe) site. Report on file at Nebraska State Historical Society, Lincoln.

Mick, L.S. 1983. An ecological evaluation of faunal diversity in the Central Plains tradition. Unpublished MA thesis, University of Nebraska–Lincoln.

Moulton, G.E., ed. 1987. *The Journal of Lewis and Clark Expedition, August 25, 1804–April 6, 1805*, vol. 3. University of Nebraska Press, Lincoln.

Nelson, E.W. 1925. Status of the pronghorned antelope, 1922–1924. *Bulletin of the United States Department of Agriculture* 1346:1–64.

Nepstad-Thornberry, C., L.S. Cummings, and K. Puseman. 2002. A model for the Upper Republican subsistence and nutrition in the Medicine Creek locality: A new look at extant data. In *Medicine Creek: Seventy Years of Archaeological Investigations*, ed. D.C. Roper, 197–211. University of Alabama Press, Tuscaloosa.

O'Gara, B.W. 1978. *Antilocapra americana*. *Mammalian Species* 90:1–7.

O'Gara, B.W., and J.D. Yoakum. 2004. *Pronghorn Ecology and Management*. University Press of Colorado, Boulder.

Ord, G. 1815. Zoology of North America. In *A Universal Geography, or a View of the Present State of the Known World*, compiled by W. Guthrie, 2:290–361. 2nd ed. Johnson and Warner, Philadelphia. Reprint, 1894. Samuel N. Rhoads, Haddonfield, NJ.

O'Shea, J.M., and J. Ludwickson. 1992. *Archaeology and Ethnohistory of the Omaha Indians: The Big Village Site*. University of Nebraska Press, Lincoln.

Parmalee, P.W., B.B. McMillan, and F.B. King. 1976. Changing subsistence patterns at Rodgers Shelter. In *Prehistoric Man and His Environments: A Case Study from the Ozark Highlands*, ed. W.R. Wood and R.B. McMillan, 141–61. Academic Press, New York.

Parmalee, P.W., and R.D. Oesch. 1972. Pleistocene and Recent faunas from the Brynjulfson Caves, Missouri. *Reports of Investigations, Illinois State Museum* 25:1–52.

Paul Wilhelm, Duke of Württemberg. 1973. *Travels in North America, 1822–1824*. Translated by W.R. Nitske and edited by S. Lottinville. American Exploration and Travel Series, 63. University of Oklahoma Press, Norman.

Pepperl, R.E., and C.R. Falk. 1983. *Native American Archeological Resources of the Central Niobrara River Valley: The Norden Study, North-Central Nebraska*. Division of Archeological Research, Department of Anthropology, University of Nebraska–Lincoln, Technical Report 82-10.

Renaud, E.B. 1933. *Archaeological Survey of Western Nebraska*. Department of Anthropology, University of Denver.

Roosevelt, T., T.S. van Dyke, D.G. Elliot, and A.J. Stone. 1902. *The Deer Family*. Macmillan Company, New York.

Semken, H.A., Jr. 1982. Mammalian remains. In *A Preliminary Report on the Arthur Site, East Okoboji Lake, Iowa*, ed. J.A. Tiffany, 119–32. Office of the State Archaeologist of Iowa, Research Papers Series 7 (1):1–305.

Semken, H.A., Jr., and C.R. Falk. 1987. Late Pleistocene/Holocene mammalian faunas and environmental changes on the northern plains of the United States. In *Late Quaternary Mammalian Biogeography and Environments of the Great Plains and Prairies*, ed. R.W. Graham, H.A. Semken, Jr., and M.A. Graham, 176–313. Illinois State Museum, Scientific Papers 22:1–491.

Sexson, M.L., and J.R. Choate. 1981. Historical biogeography of the pronghorn in Kansas. *Transactions of the Kansas Academy of Science* 84:128–33.

Shaw, J.H., and M. Lee. 1997. Relative abundance of bison, elk, and pronghorn on the Southern Plains. *Plains Anthropologist* 42:163–72.

Snyder, L.M., and J.R. Bozell. 1983. *Identification and Analysis of Vertebrate Faunal Remains Recovered from the Logan Creek Site (25bt3), Burt County, Nebraska*. Division of Archeological Research, Department of Anthropology, University of Nebraska–Lincoln, Technical Report 83-03.

Stansbury, H. 1852. *Exploration and Survey of the Valley of the Great Salt Lake of Utah, Including a*

Reconnaissance of a New Route through the Rocky Mountains. Lippincott, Grambo and Company, Philadelphia.

Strong, W.D. 1935. An introduction to Nebraska archeology. *Smithsonian Miscellaneous Collections* 93 (10):1–323.

Swenk, M.H. 1908. A preliminary of the mammals of Nebraska, with synopses. *Proceedings of the Nebraska Academy of Sciences* 8:61–144.

Swenk, M.H. 1915. The birds and mammals of Nebraska, I. *The Nebraska Blue Book for 1915*, pp. 835–55. State Journal Company, Lincoln, NE.

Tiffany, J.A., S.J. Schermer, J.L. Theler, D.W. Owsley, D.C. Anderson, E.A. Bettis III, and D.M. Thompson. 1988. The Hanging Valley site (13HR28): A stratified Woodland burial locale in western Iowa. *Plains Anthropologist* 33:219–59.

Townsend, J.K. 1839. *Narrative of a Journey Across the Rocky Mountains, to the Columbia River, and a Visit to the Sandwich Islands, and Chili, &c.: With a Scientific Appendix*. H. Perkins, Philadelphia. Reprint (pp. 1–186 and 217–264 of the original), Bison Books, University of Nebraska Press, Lincoln, 1978.

Walker, D.N. 2000. Pleistocene and Holocene records of *Antilocapra americana*: A review of the FAUNMAP data. *Plains Anthropologist* 45:13–28.

Watson, D.R. 1996. Chapter 5: Summary of faunal analysis and artifacts. In *The Tahaksu Site (25MK15), Merrick County, Nebraska*, ed. J.K. Peterson and S.R. Holen, 128–36. Nebraska Archaeological Survey, University of Nebraska State Museum, Technical Report 96-03.

Wedel, W.R. 1936. An introduction to Pawnee archeology. *Smithsonian Institution, Bulletin of the Bureau of American Ethnology* 112:1–122.

Wedel, W.R. 1986. *Central Plains Prehistory: Holocene Environments and Culture Change in the Republican River Basin*. University of Nebraska Press, Lincoln.

Widga, C.C. 2004. Early Archaic subsistence in the Central Plains: The Spring Creek (25FT31) fauna. *Plains Anthropologist* 49:25–58.

Widga, C.C. 2006. Bison, bogs, and big bluestem: The subsistence ecology of Middle Holocene hunter-gatherers in the eastern Great Plains. Unpublished PhD diss., University of Kansas, Lawrence.

Winfrey, J.V. 1991. Spatial distribution of cultural material and post-depositional disturbances at the Wallace site (25GO2): A Plains Woodland occupation site in south-central Nebraska. Unpublished MA thesis, University of Nebraska–Lincoln.

Wolcott, R.H., and F.H. Shoemaker. 1919. Nebraska's game resources and their conservation. *Bulletin of the Nebraska Conservation and Soil Survey* 12:1–32.